

THE TINEOID MOTH FAMILY ERIOCOTTIDAE (LEPIDOPTERA) IN AUSTRALIA

Ebbe S. Nielsen¹ and Gaden S. Robinson²

¹Division of Entomology, C.S.I.R.O., G.P.O. Box 1700, Canberra,
A.C.T., 2601

²Department of Entomology, The Natural History Museum, Cromwell
Road, London, SW7 5BD, UK

Abstract

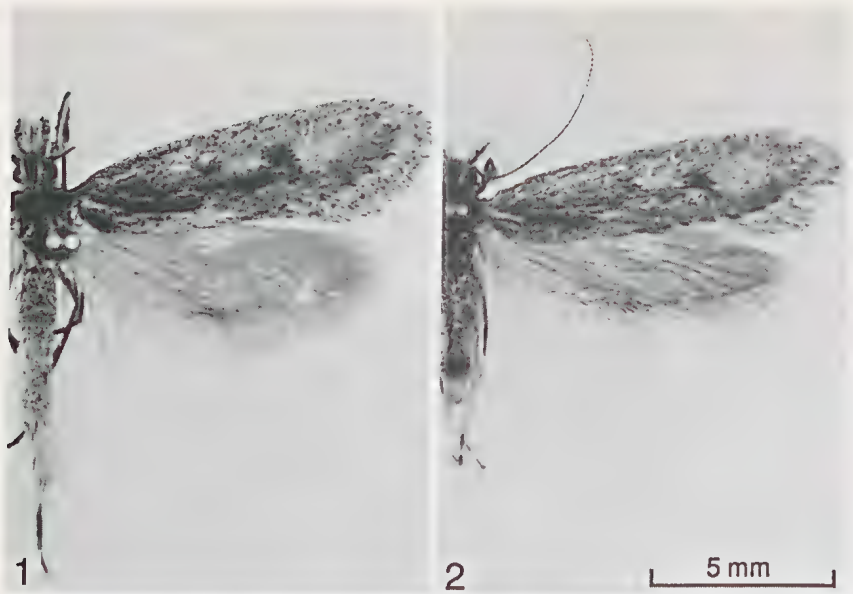
The monobasic genus *Eucryptogona* Lower, 1901, originally placed in the Oecophoridae, is here recognised as the first known Australian representative of the family Eriocottidae. The morphology of *Eucryptogona* is described, and a lectotype designated for its single included species, *Eucryptogona trichobathra* Lower, 1901, known only from Broken Hill, New South Wales. *Eriocottis euryphracta* Meyrick, 1893, described from South Australia, is not an eriocottid and it is here transferred formally to the Yponomeutidae; its generic placement is, however, uncertain.

Introduction

Although Meyrick (1893) described *Eriocottis euryphracta* from Australia, the presence of the family Eriocottidae in that continent has never been confirmed and Meyrick's placement of *E. euryphracta* has been treated with scepticism. The literature to date records Eriocottidae as being restricted to the Afrotropical, Oriental and Palaearctic regions. However, the distribution of Eriocottidae is much broader than that (Davis 1990), and in this paper we provide the first unequivocal record of the family from Australia.

In 1901 Oswald Lower described a moth from Broken Hill as *Eucryptogona trichobathra*. He formally placed this new species and genus in the Oecophoridae, though suggested that it might be better placed in the Plutellidae, based on characters of its wing venation, antennae and labial palpi. Lepidopterists have subsequently associated specimens of *Eucryptogona* with the Tineoidea in collections. In the course of work on the Australian Tineidae (Robinson & Nielsen in press) we examined *Eucryptogona* and found that it was a typical representative of the family Eriocottidae.

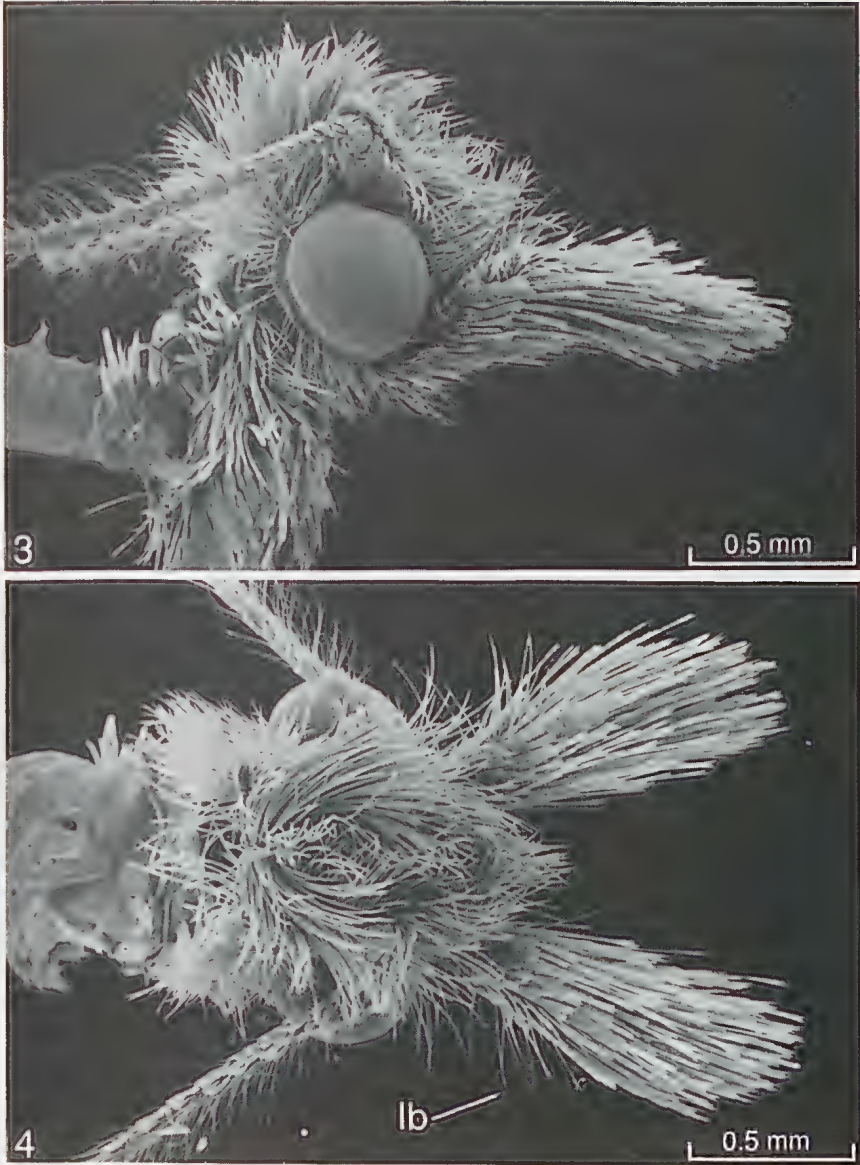
The family has been recognised and formally named three times as Eriocottidae, Deuterotineidae and Compsoctenidae. These three family names were recognized as representing the same family, Eriocottidae, with two subfamilies, Eriocottinae and Compsocteninae, by Nielsen (1978). That study summarized the morphology and systematic position, and diagnosed the family and its subfamilies; additional morphological observations are provided by Davis (1990). Robinson (1988) lists the following characters as eriocottid autapomorphies: (1) ovipositor with dorsal apophyses and (2) sternum VIII of female membranous, and the following as eriocottine autapomorphies: (1) antennal scaling sparse, (2) antenna filiform and (3) ocelli present.



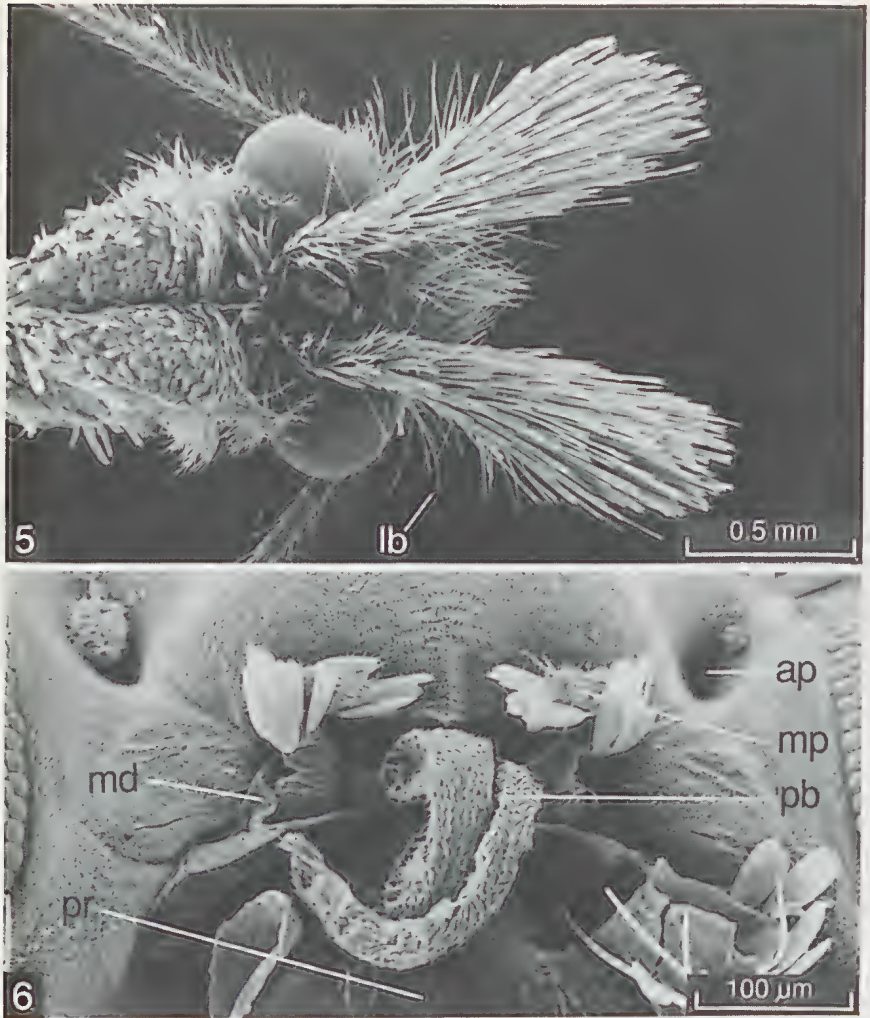
Figs 1, 2. *Eucryptogona trichobathra*, adult males.

Compsocteninae, with a single genus *Compsoctena* Zeller, 1852 with numerous species, occur through Africa (Dierl 1970), India, China, Taiwan and into Indonesia (Davis 1990). Eriocottinae are known from Africa north of the Sahara, southern Europe and USSR, possibly Pakistan (Nielsen 1982), Thailand (Robinson, unpubl.), and Taiwan (Davis 1990). Davis (1990) reports five species from the New World, from Chile, Brazil, Columbia and Venezuela, all in a single genus, *Crepidochares* Meyrick, 1922. The Old World species are all placed in *Eriocottis* Zeller, 1847 and *Deuterotinea* Rebel, 1901 with more than 10 species in the former and more than 6 species in the latter (Zagulajev 1988; Davis 1990).

The Eriocottidae are a comparatively derived family within the Tineoidea, suggested by Robinson (1988) to be the most 'primitive' ditrysiyan superfamily and the sister-group of all other Ditrysia. *Eucryptogona* exhibits typical tineoid synapomorphies of erect scaling on the frons, lateral bristles on the labial palpi, and short proboscis. Further characters of *Eucryptogona* are synapomorphies of Eriocottidae + Acrolophidae + Psychidae: maxillary palpus with reduced segmentation, forewing vein R5 running to termen, retinaculum a broad lobe arising between costa and Sc, and apex of sacculus with a thorn-like sensillum. Nielsen (1978) suggested the Eriocottidae and Psychidae as each other's closest relatives, while Robinson's (1988) analysis of the tineoid families gave Acrolophidae



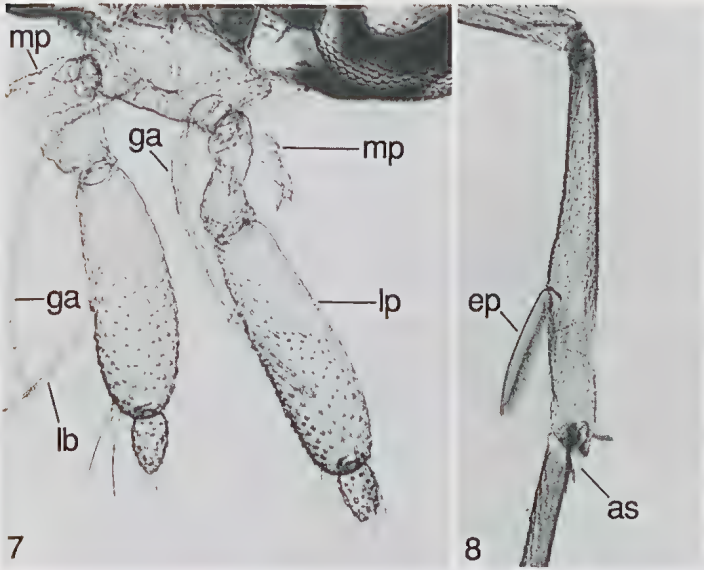
Figs 3, 4. *Eucryptogona trichobathra*, head, 3: lateral; 4: dorsal. Note prominent labial palpi and lateral bristles (lb).



Figs 5, 6. *Eucryptogona trichobathra*, head and mouth parts. 5: head in ventral view; 6: mouthparts in ventral view (labial palps removed). ap: anterior tentorial pit; lb: lateral bristles; md: mandible; mp: maxillary palp; pb: proboscis; pr: prelabium.

+ Psychidae as the sister-group of the Eriocottidae. Based on the presence of microtrichia on the wing surface of Eriocottidae, Davis (1990) argues that the Eriocottidae may represent the most basal ditrysian lineage.

No attempt has as yet been made to analyse the phylogeny of the

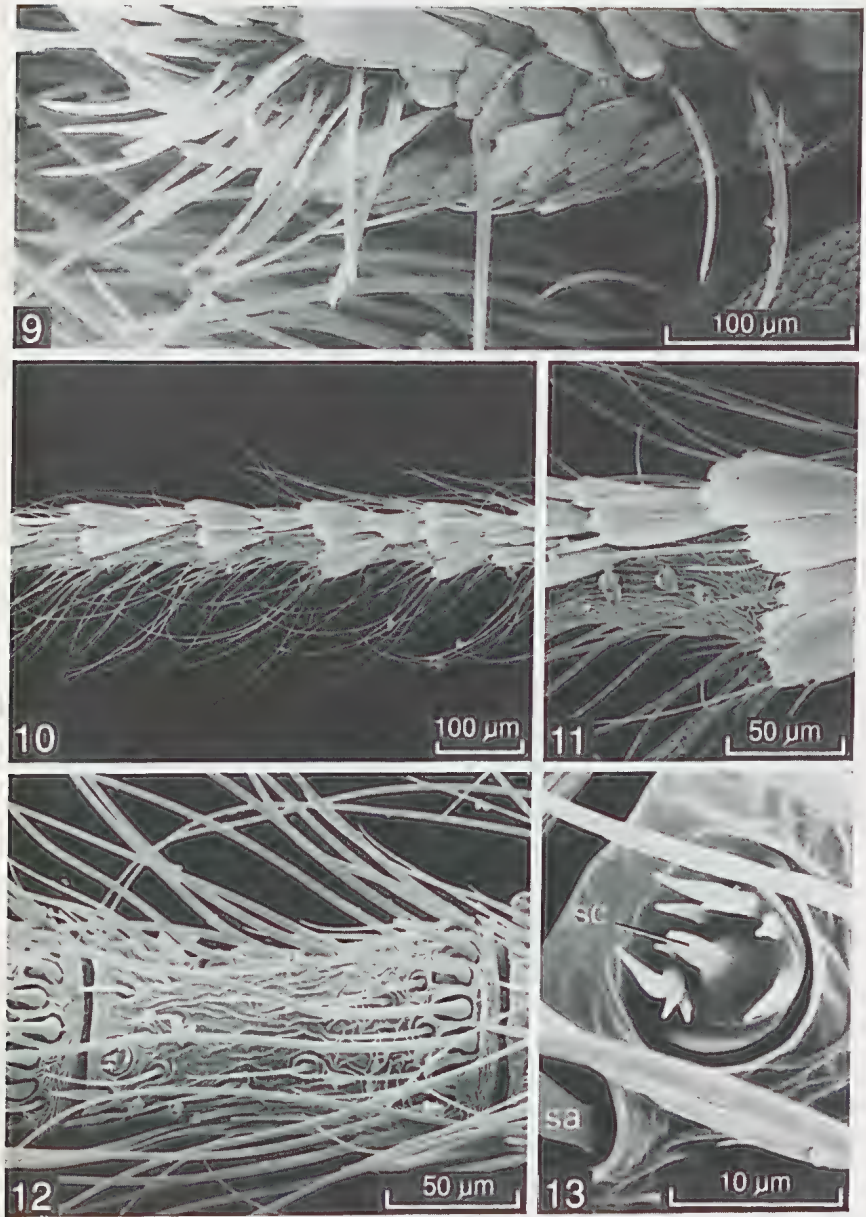


Figs 7, 8. *Eucryptogona trichobathra*, mouth parts and leg. 7: mouth parts showing labial palpi; 8: fore tibia. as: apical spine; ep: epiphysis; ga: galea; lb: lateral bristle; lp: labial palpus; mp: maxillary palpus.

eriocottine genera. However, there is little doubt that the Australian genus *Eucryptogona* is distinct from all other genera. As described below, it displays such obvious autapomorphies as long-ciliate antennae, absence of pilifers, reduced maxillary palpus, minute apical segment of labial palpus, specialized vestiture on labial palpus, and male genitalia with bare ventromedial digitate process.

Although 10 specimens of *E. trichobathra* are known, none of these is a female. Comparison with *Deuterotinea*, a genus with long-winged males and wingless females (Zagulajev 1988) that is restricted to arid climates, suggests that *Eucryptogona* could also have wing-reduced females.

The life history is not fully known for any species of Eriocottinae. Anecdotal accounts indicate that larvae of *Eriocottis* feed in decaying wood or as stem-borers (Nielsen 1978). Larvae of *Deuterotinea* are detritophagous and construct silken tunnels among grass litter (Zagulajev 1988). The extensible ovipositors indicate that the eggs are inserted into crevices. The pupa of *Deuterotinea* has a single



Figs 9-13. *Eucryptogona trichobathra*, antenna. 9: scape with pecten; 10: antenna at one-third, lateral view; 11: detail of 10. 12: antenna at midlength, ventral view, note long sensilla trichodea; 13: detail of 12, sensillum auricillium (sa) and s. coeloconicum (sc).

transverse row of posteriorly directed spines near the anterior margin of the abdominal terga and a prominent pair of curved, ventrally directed terminal spines (Nielsen, unpubl.). Adults of *Eriocottis* fly during the day and also come to light.

Eriocottis has previously been reported from Australia. Meyrick (1893: 514) named *Eriocottis euryphracta* from Port Lincoln, South Australia. However, this species does not belong to the Eriocottidae or even to the Tineoidea, but is tentatively allocated to the Yponomeutidae, its final generic assignment pending further study.

***Eucryptogona* Lower**

Eucryptogona Lower, 1901, *Trans. R. Soc. S. Aust.* **25**: 97. Type species: *Eucryptogona trichobathra* Lower, 1901, *ibidem* **25**: 98, by monotypy.

Redescription

Wingspan 18-21 mm. Head with moderately swollen compound eyes, interocular index 1.0. Ocelli absent. Head vestiture (Figs 3-5) rough, of piliform scales; vertex with raised scales and one pair of tufts of anteriorly directed scales; frons with scale-sockets in w-shaped patch, and with close-set microtrichia, scales directed forwards with one medial tuft directed upwards.

Pilifers absent (Fig. 6). Mandible digitate, weakly sclerotized, reaching almost to midline. Maxillary palpus minute, of three segments of subequal length, entire palp about as long as proximal segment of labial palpus; two apical segments with scattered scales, apical segment additionally with microtrichia and long apical sensilla (Fig. 6); galea 0.8 x length of labial palpus (1.2 x height of head capsule), with prominent humps with sensilla on lateral surface. Labial palpus on prominent prelabium, long (1.4 x height of head capsule) and prominent, 3-segmented, ratio 2.5:5.4:1 (base to tip), proximal segment curved, middle segment straight, swollen and markedly wider than proximal segment, apical segment minute, ovate, with subapical hump with sensilla (Fig. 7); palpus porrect with prominent tan-coloured vestiture of long, apically divided piliform scales; scale sockets present on all segments, extremely close-set on apical portion of middle segment; middle segment with scattered lateral bristles, apical segment with microtrichia.

Antennae (Figs 9-13) reaching 0.6 length of forewing, scape with pecten of approximately 16 bristles (Fig. 9); flagellomeres each with one annulus of lamellar scales on proximal third of flagellum (Fig. 10); each flagellomere with sensilla trichodea up to 5 x width of flagellum from a basal annulus, two long s. trichodea from just before midlength, and scattered shorter s. trichodea (Fig. 12); flagellomeres apically with s. coeloconicum and s. auricillicum (Figs 12, 13).

Legs long and slender; fore tibia with epiphysis with short setae on

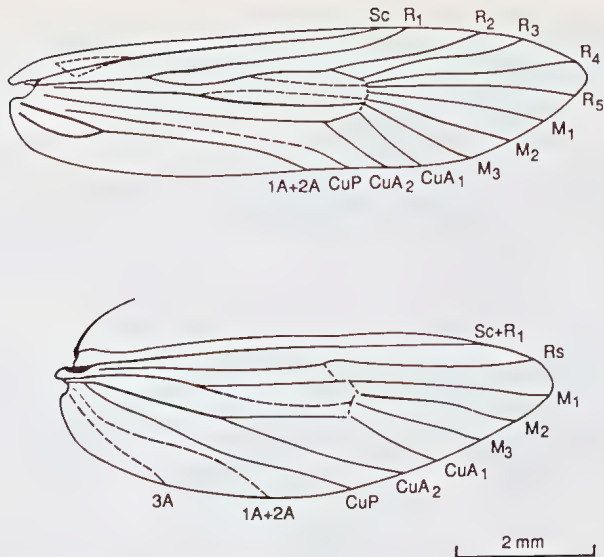


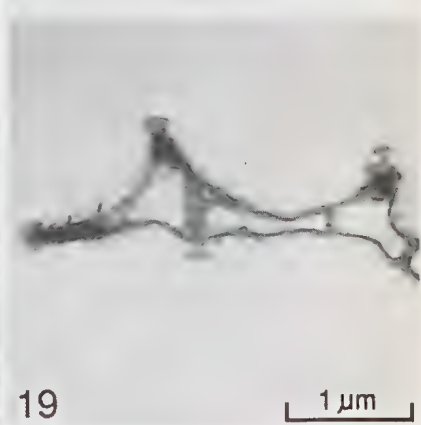
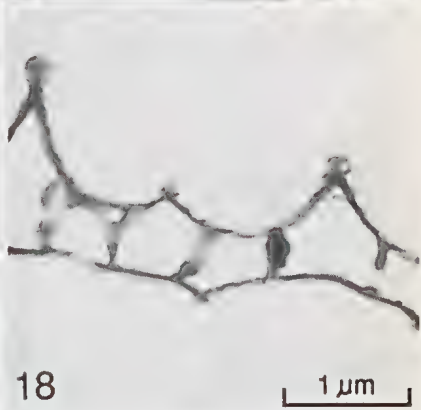
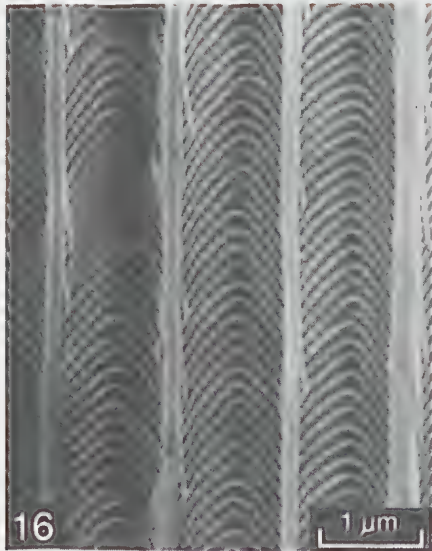
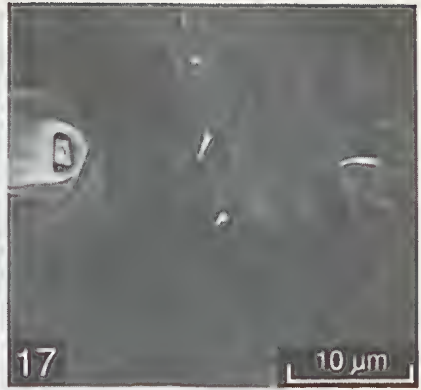
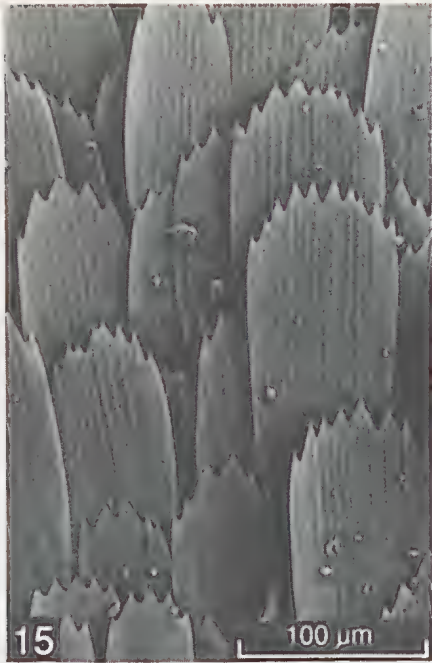
Fig. 14. *Eucryptogona trichobathra*, wing venation.

proximal surface and with long hair-scales on opposing tibial surface, tip of each tarsomere with 2-5 strong spines.

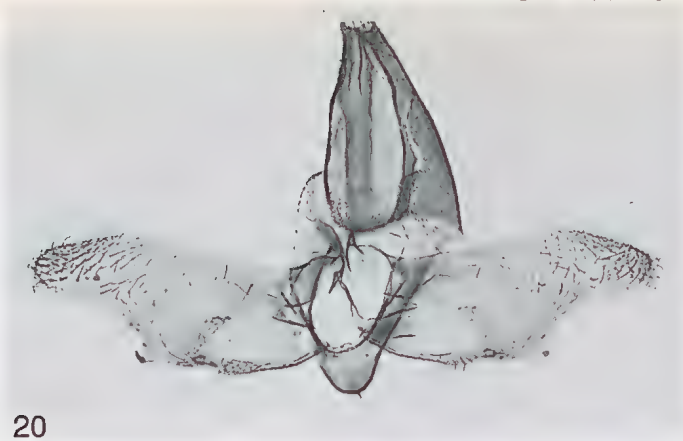
Wings. Forewing index 0.25, wing elongate, almost parallel-sided, hindwing index 0.33, apex rounded. Retinaculum in male from between costa and subcosta. Forewing (Fig. 14) with all five R and three M veins free, R5 to termen well below apex, cell with chorda and divided M-stem; hindwing with divided M-stem in cell. Only normal-type scales with rounded, dentate apical edge observed (Fig. 15); windows minute or absent (Fig. 16), but scales well lacunated (Figs 18, 19); upper surface of forewing with scattered microtrichia (Fig. 17).

Pre genital abdomen. S II with anterior portion well sclerotized and posterior part very weakly sclerotized; apodemes slender with sensory wart (?) at base; sterna very weakly sclerotized. T I and II well sclerotized, III and IV less so, V-VII very weakly sclerotized. Pleural membrane at segments II and III each with two pairs of tuberculate plates, one posterodorsal and one posteroventral to spiracles.

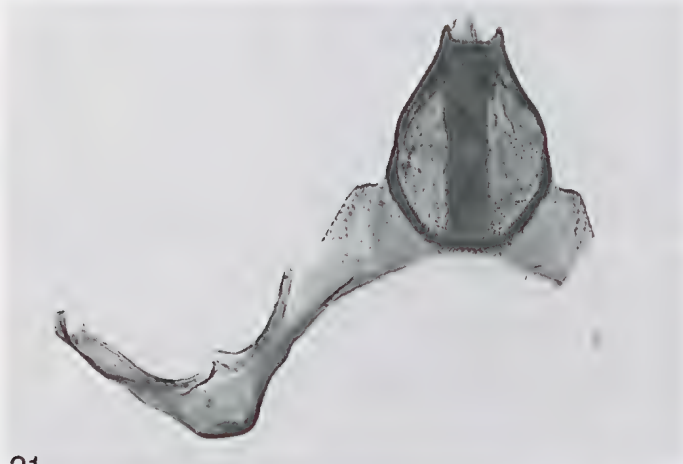
Male genitalia (Figs 20-23). S VIII curved rectangular. T VIII subtriangular; segment VIII otherwise unremarkable. Vinculum short, broadly U-shaped. Tegumen hood-shaped, posteriorly produced into two blunt, narrow lobes (? uncus); lobes and posterolateral edge of tegumen setose. Socii absent. Gnathos slender, U-shaped, middle portion with fine spines; subscaphium elongate plate-shaped, anterior end fused with middle of gnathos. Valva elongate, basal portion



Figs 15-19. *Eucryptogona trichobathra*, wing scales. 15: cover of normal type scales; 16: ultra structure of normal type scale, note absence of conspicuous windows; 17: scattered microtrichia on upper forewing surface (near tornus); 18, 19: cross-section of normal type scales (TEM), note prominent lacunae.



20



21



22

23

Figs 20-23. *Eucryptogona trichobathra*, male genitalia. 20: 'normal' mount (slide ANIC 1039); 21: 'unrolled' mount, valva removed; 22: valva; 23: aedeagus (all slide ANIC 2922).

broadest, dorsal margin slightly concave, distal narrow part (cucullus) protruding ventrolaterally; cucullus, distal inner surface and ventral margin of valva setose; ventral margin with triangular process with thorn-like sensillum; between base and triangular process a well sclerotized bare blunt digital process from distal end of a longitudinal fold; centre of valva with short blunt setose process. Aedeagus a single curved tube. Juxta absent.

Female genitalia. Unknown.

***Eucryptogona trichobathra* Lower**

Eucryptogona trichobathra Lower, 1901, *Trans. R. Soc. S. Aust.* 25: 98. LECTOTYPE ♂ (here designated), AUSTRALIA, New South Wales, Broken Hill, 24.v.1899 ('3565 Type') (Lower). Without abdomen. SAMA [examined].

Redescription

Male (Figs 1, 2). Wingspan 18-21 mm. Head and thorax mottled reddish grey-brown, many scales pale-tipped. Fore and mid legs dark brown with many pale-tipped scales; tarsomeres apically cream; hindlegs brownish cream with light cream hair scales on upper surface of tibia. Forewing reddish grey-brown mixed with reddish brown, black and cream, variable; darkest along costa and dorsum, palest behind costa; with a small greyish black spot at one-half and a longer spot at two-thirds, and greyish black tinge particularly along fold; cilia pale brownish grey, cream at apex and tornus. Hindwing pale grey, with brown along dorsum and termen; cilia similar.

Female. Unknown.

Male genitalia. See generic redescription above.

Distribution

Only known from Broken Hill, New South Wales.

Biology

Lower (1901) recorded three specimens in May. Only a single specimen, the lectotype, is labelled with a collecting date, 24 May.

Material examined (additional to lectotype)

9 ♂, New South Wales, Broken Hill (variously labelled 'Broken Hill' and 'Broken Hill Coll. Lower') (ANIC, BMNH, SAMA).

Acknowledgments

We thank Dr G.F. Gross and Ms J. Forrest, South Australian Museum, Adelaide (SAMA) for the loan of specimens. Dr D.R. Davis, U.S. National Museum of Natural History, Washington DC, USA, kindly gave us access to his unpublished manuscript. Mr E.D. Edwards and Dr M. Horak, ANIC, Canberra, commented on drafts

of the manuscript. Illustrations were provided by Mr J. Green (photography), Ms L. Warrener (line drawing), Ms K. Pickerd (SEM), Ms E. Brooks and Mr E. Hines (TEM).

References

- DAVIS, D.R. 1990. Neotropical Microlepidoptera XXIII. First report of the family Eriocottidae from the New World, with descriptions of new taxa. *Proceedings of the Entomological Society of Washington* 92: 1-35.
- DIERL, W. 1970. Compsoctenidae: Ein neues Taxon von Familienstatus (Lepidoptera). *Veröffentlichungen der Zoologischen Staatssammlung München* 14: 1-41, pls 1, 2.
- LOWER, O.B. 1901. Descriptions of new genera and species of Australian Lepidoptera. *Transactions of the Royal Society of South Australia* 25: 63-98.
- MEYRICK, E. 1893. Descriptions of Australian Micro-Lepidoptera. *Proceedings of the Linnean Society of New South Wales* 7: 477-612.
- NIELSEN, E.S. 1978. On the systematic position of the genus *Eriocottis* Zeller, 1847, with remarks on the phylogeny of primitive Tineoidea (Lepidoptera). *Entomologica Scandinavica* 9: 279-296.
- NIELSEN, E.S. 1982. Incurvariidae and Prodoxidae from the Himalayan area (Lepidoptera: Incurvarioidae). *Insecta Matsumurana* 26: 187-200.
- ROBINSON, G.S. 1988. A phylogeny for the Tineoidea (Lepidoptera). *Entomologica Scandinavica* 19: 117-129.
- ROBINSON, G.S. and NIELSEN, E.S. (In press). Tineid genera of Australia (Lepidoptera). *Monographs on Australian Lepidoptera* 2.
- ZAGULAJEV, A.K. 1988. Ochsenheimeriidae, Eriocottidae. Lepidoptera 4(7). [In Russian.] *Fauna SSSR* 135: 1-302, pls 1, 2.